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Richardson et al.

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(54) **SYSTEM AND METHOD FOR ENHANCED MESSAGE NOTIFICATION**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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(65) **Prior Publication Data**

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Related U.S. Application Data

(63) Continuation of application No. 13/101,381, filed on May 5, 2011, now Pat. No. 8,548,129, which is a continuation of application No. 11/762,277, filed on Jun. 13, 2007, now Pat. No. 7,953,395, which is a

(Continued)

(51) **Int. Cl.**
H04M 1/64 (2006.01)
H04W 4/12 (2009.01)
(Continued)

(52) **U.S. Cl.**
CPC ***H04W 4/12*** (2013.01); ***H04M 3/42068*** (2013.01); ***H04M 3/537*** (2013.01); ***H04M 3/5322*** (2013.01); *H04M 3/42374* (2013.01); *H04M 2203/652* (2013.01)

(58) **Field of Classification Search**
CPC H04W 4/12; H04W 4/14; H04W 4/18; H04W 4/185
USPC 370/259–271, 351–357; 379/67.1–88.28, 201.01; 455/412.1–426.2, 456.1–466, 455/550.1–560, 575.1–575.9, 90.1–90.3; 704/270–278; 709/201–207, 217–248
See application file for complete search history.

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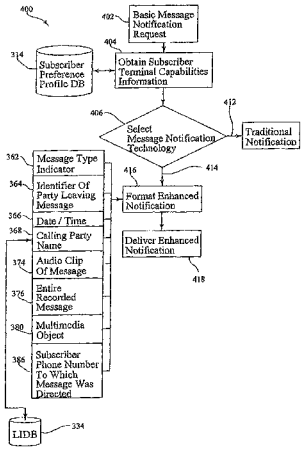
(57) **ABSTRACT**

Enhanced message notification is provided by an enhanced notification function element and a subscriber preference profile database. The enhanced notification function element queries the subscriber preference profile database to obtain subscriber communication terminal capabilities information, which it uses to select a message notification technology. The enhanced notification function element may then format an enhanced notification that is delivered to a communication terminal through a delivery system architecture appropriate for the selected message notification technology. The enhanced notification may contain: a message type indicator; an identifier of the party leaving the message; a date and time that the message was deposited; multimedia objects; and other enhanced information. The enhanced notification function element may also query a terminal roaming status database in order to determine if the enhanced message should be sent when the terminal is roaming. The enhanced notification function element may also provide content adaptation for the enhanced notification.

20 Claims, 13 Drawing Sheets



Related U.S. Application Data

continuation of application No. 10/938,350, filed on Sep. 10, 2004, now Pat. No. 7,248,857, which is a continuation-in-part of application No. 10/789,616, filed on Feb. 27, 2004, now Pat. No. 7,277,529.

(60) Provisional application No. 60/450,738, filed on Feb. 27, 2003.

(51) **Int. Cl.**

H04M 3/42	(2006.01)
H04M 3/53	(2006.01)
H04M 3/537	(2006.01)

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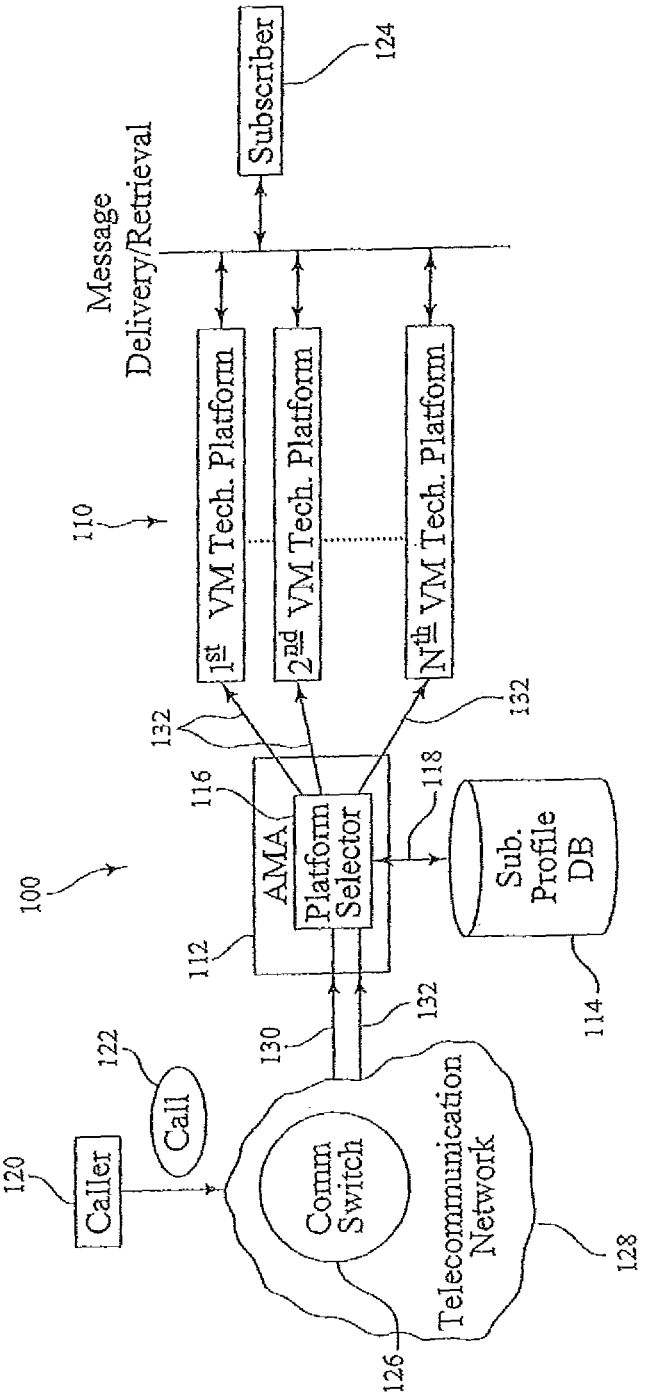

Subscriber
124
Message Delivery/Retrieval
110
1st VM Tech. Platform
2nd VM Tech. Platform
Nth VM Tech. Platform
132
132
116
AMA
Platform Selector
118
Sub. Profile DB
114
100
112
130
132
122
Call
120
Caller
Comm Switch
Telecommunication Network
128
126

FIG. 1

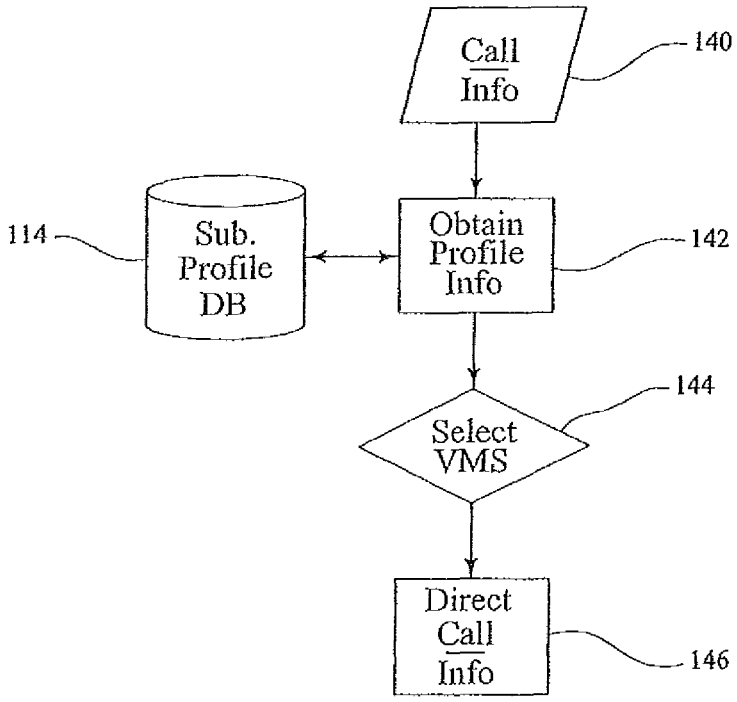

Call Info
140
Sub. Profile DB
114
Obtain Profile Info
142
Select VMS
144
Direct Call Info
146

FIG. 2

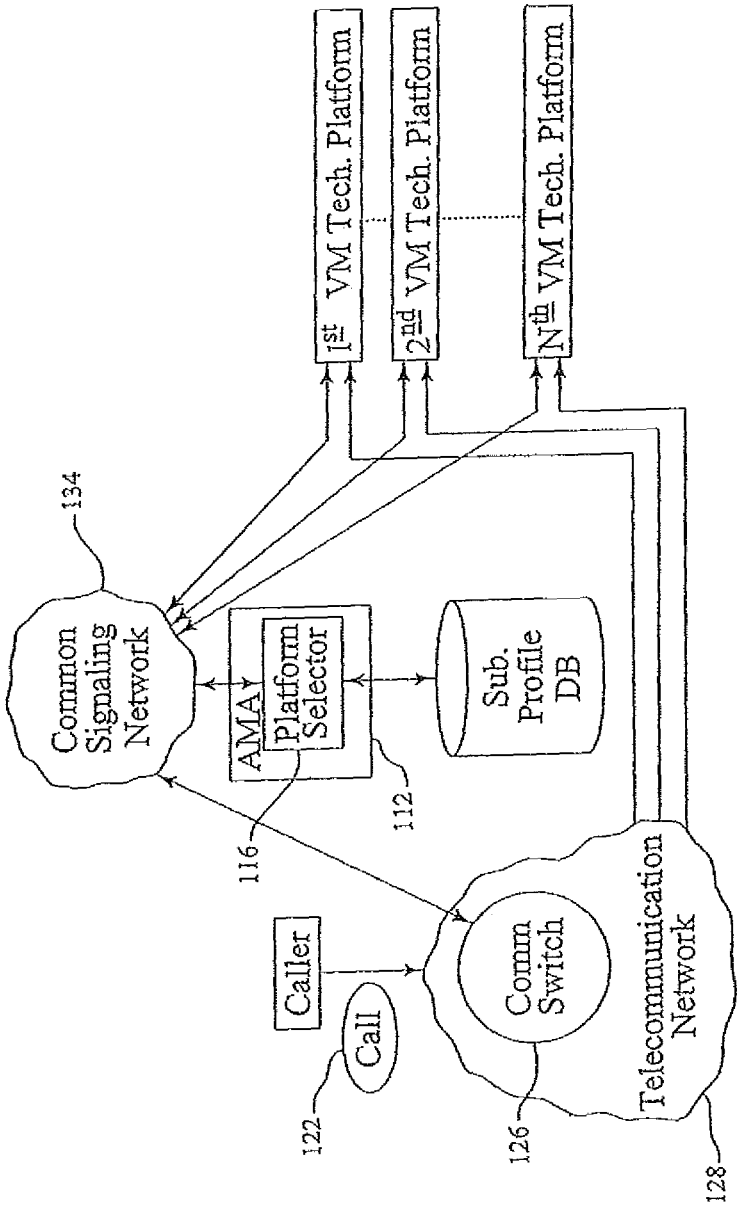

1st VM Tech. Platform
2nd VM Tech. Platform
Nth VM Tech. Platform
134
Common Signaling Network
AMA
Platform Selector
Sub. Profile DB
112
116
Caller
Call
122
Comm Switch
126
Telecommunication Network
128

FIG. 3

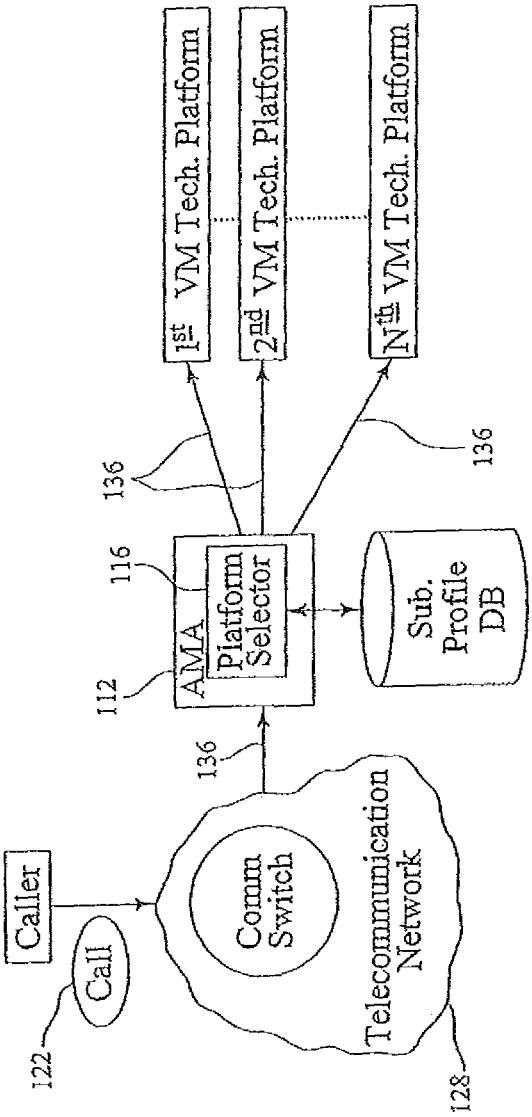

Caller
Call
122
Comm Switch
Telecommunication Network
128
136
AMA
Platform Selector
112
116
Sub. Profile DB
136
136
1st VM Tech. Platform
2nd VM Tech. Platform
Nth VM Tech. Platform

FIG. 4

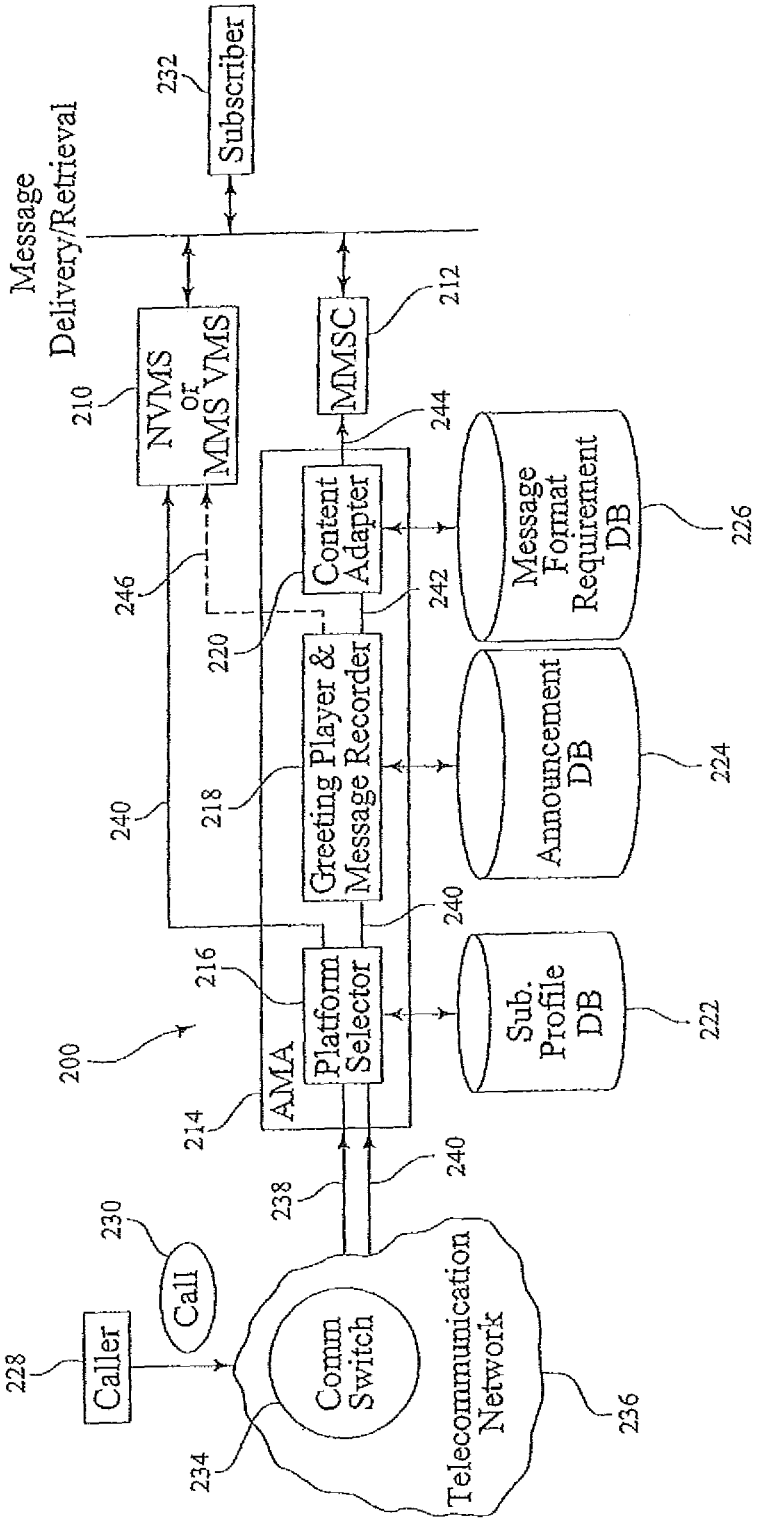

Message Delivery/Retrieval
232
Subscriber
210
NVMS or MMS VMS
212
MMSC
244
246
220
Content Adapter
242
Message Format Requirement DB
226
240
218
Greeting Player & Message Recorder
Announcement DB
224
240
216
Platform Selector
Sub. Profile DB
222
200
214
AMA
238
240
230
Call
228
Caller
Comm Switch
234
Telecommunication Network
236

FIG. 5

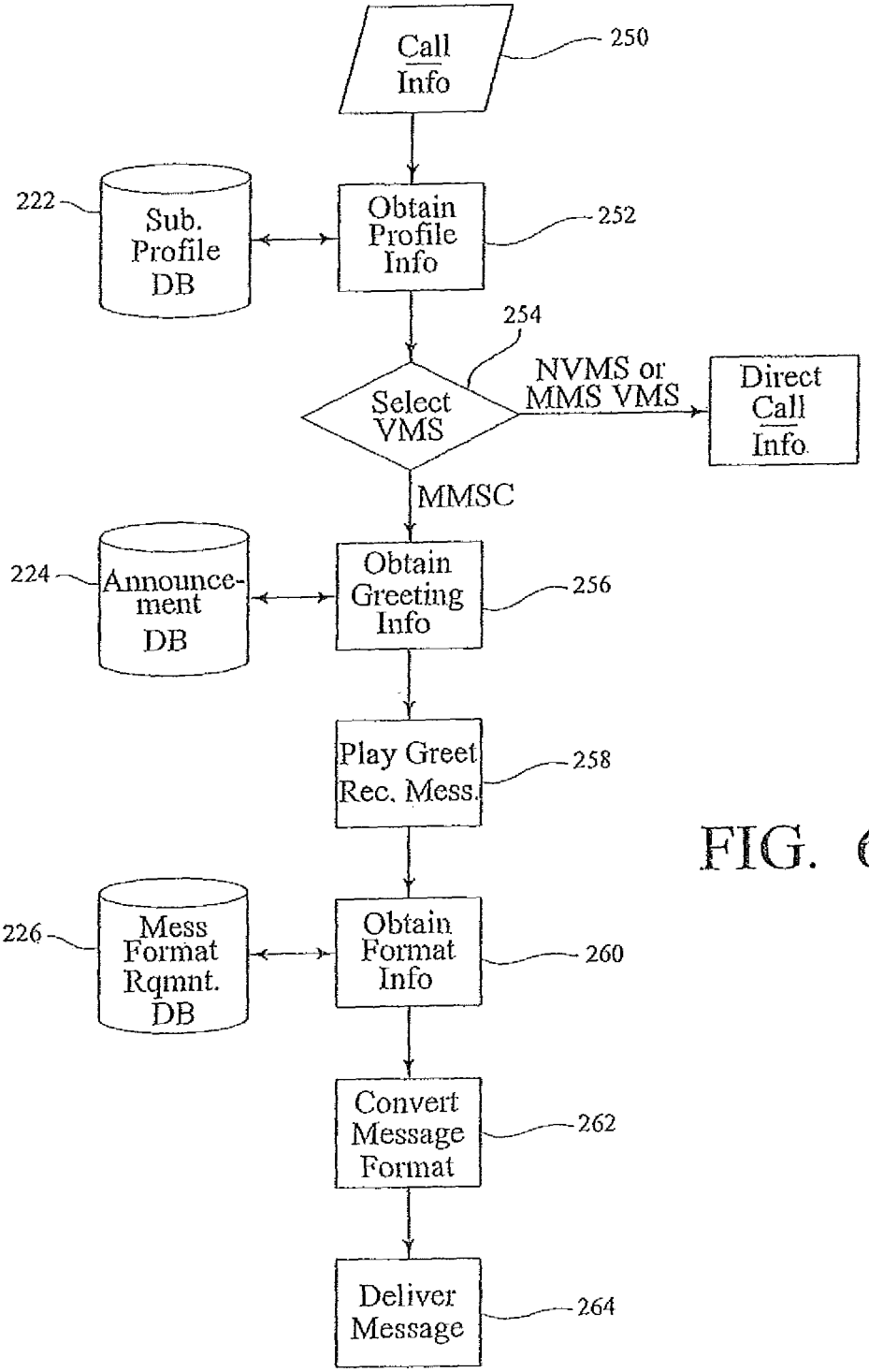

Call Info
250
222
Sub. Profile DB
Obtain Profile Info
252
254
Select VMS
NVMS or MMS VMS
Direct Call Info
MMSC
224
Announce-ment DB
Obtain Greeting Info
256
Play Greet Rec. Mess.
258
226
Mess Format Rqmnt. DB
Obtain Format Info
260
Convert Message Format
262
Deliver Message
264

FIG. 6

FIG. 7

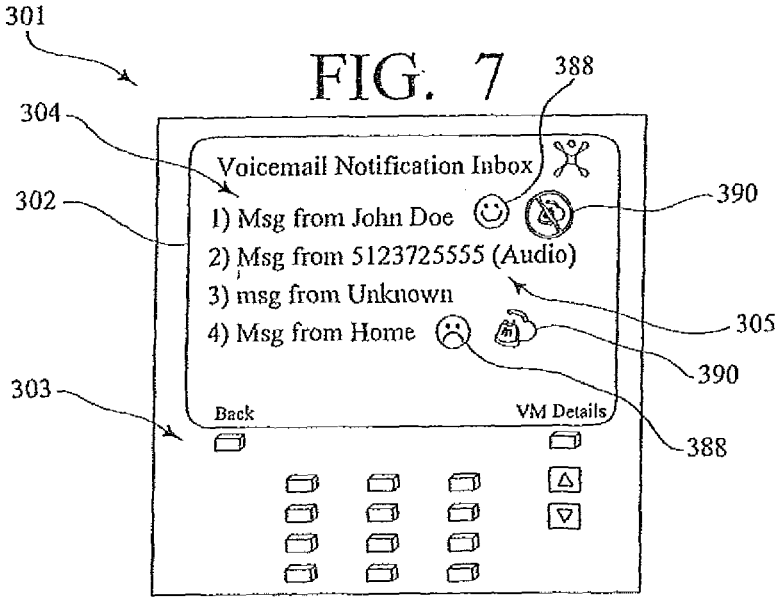
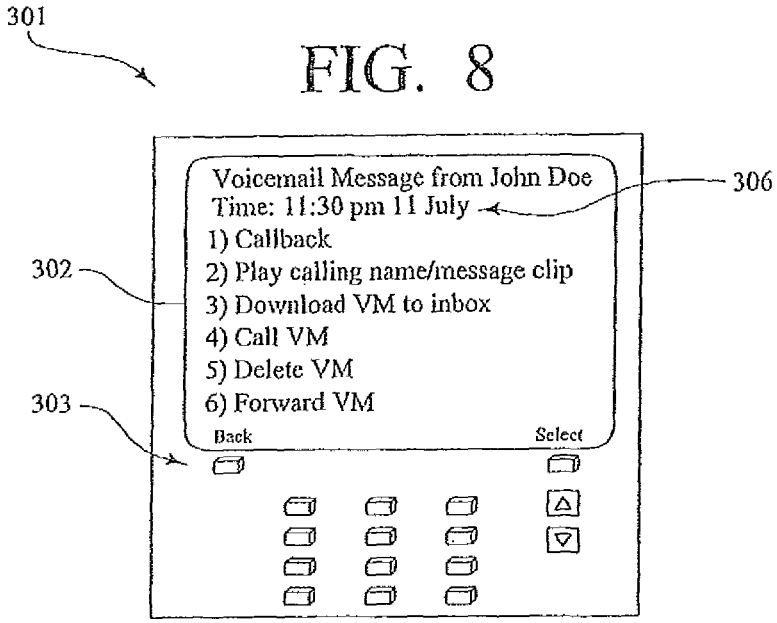

301
304
302
303
388
390
305
390
388
Voicemail Notification Inbox
1) Msg from John Doe
2) Msg from 5123725555 (Audio)
3) msg from Unknown
4) Msg from Home
Back
VM Details

FIG. 8


301
302
303
306
Voicemail Message from John Doe
Time: 11:30 pm 11 July
1) Callback
2) Play calling name/message clip
3) Download VM to inbox
4) Call VM
5) Delete VM
6) Forward VM
Back
Select

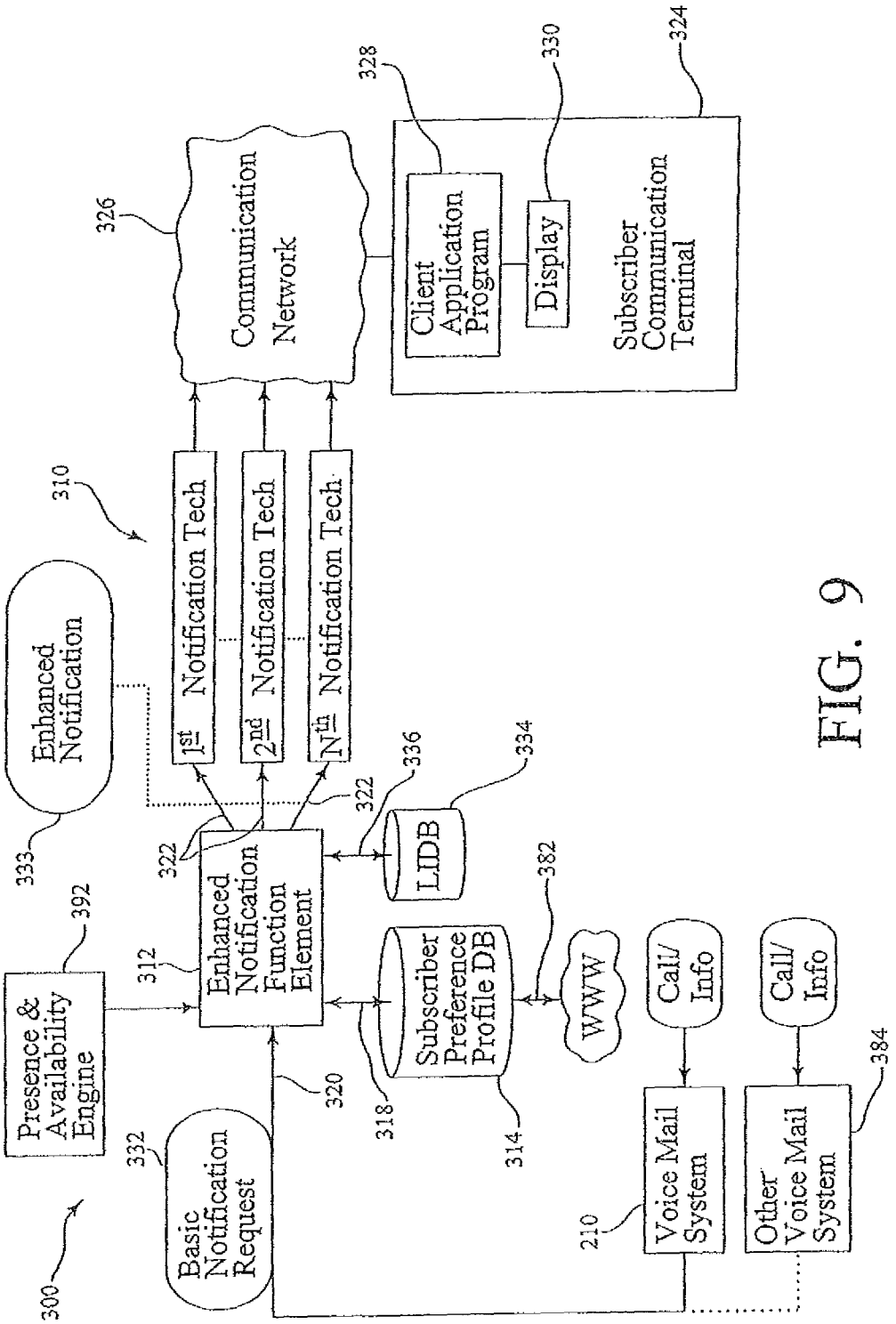

300
Presence & Availability Engine
392
Basic Notification Request
332
Enhanced Notification Function Element
312
320
Enhanced Notification
333
322
1st Notification Tech
2nd Notification Tech
Nth Notification Tech
310
Communication Network
326
Client Application Program
328
Display
330
Subscriber Communication Terminal
324
LIDB
336
334
Subscriber Preference Profile DB
318
314
WWW
382
Call/ Info
Voice Mail System
210
Other Voice Mail System
384

FIG. 9

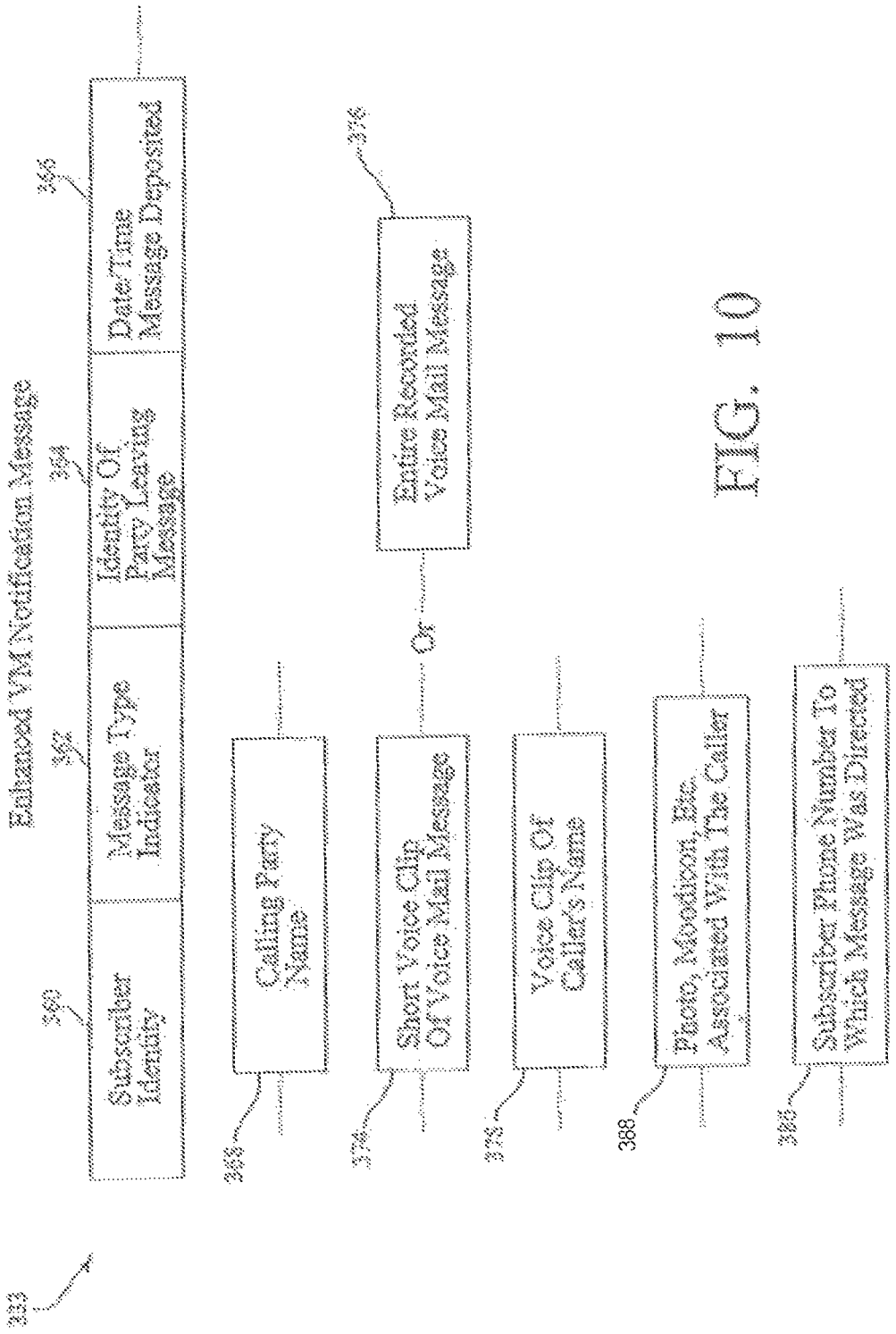

Enhanced VM Notification Message
360
362
364
366
Subscriber Identity
Message Type Indicator
Identity Of Party Leaving Message
Date/Time Message Deposited
368
Calling Party Name
374
Short Voice Clip Of Voice Mail Message
Or
376
Entire Recorded Voice Mail Message
378
Voice Clip Of Caller's Name
380
Photo, Mondicon, Etc. Associated With The Caller
382
Subscriber Phone Number To Which Message Was Directed
383

FIG. 10

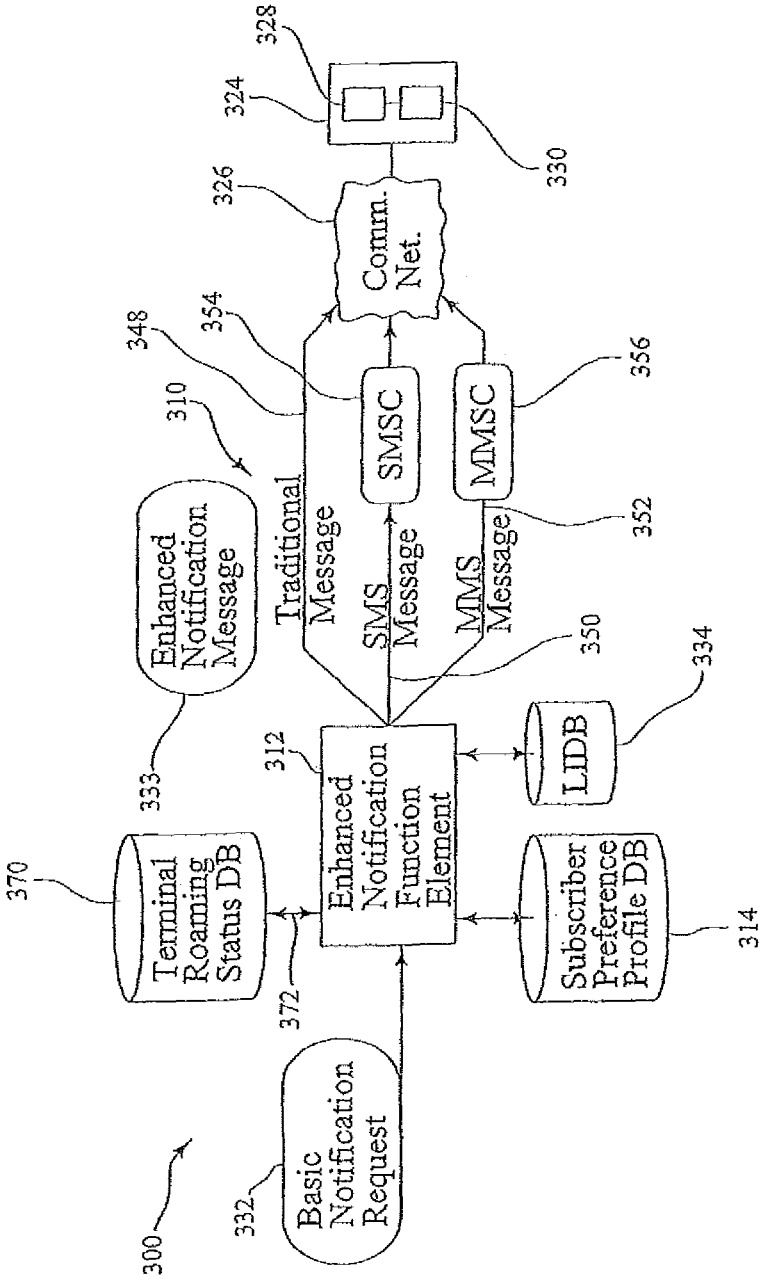

300
332
Basic Notification Request
372
370
Terminal Roaming Status DB
312
Enhanced Notification Function Element
314
Subscriber Preference Profile DB
334
LIDB
350
333
Enhanced Notification Message
310
Traditional Message
SMS Message
MMS Message
352
348
354
SMSC
MMSC
356
326
Comm. Net.
324
328
330

FIG. 11

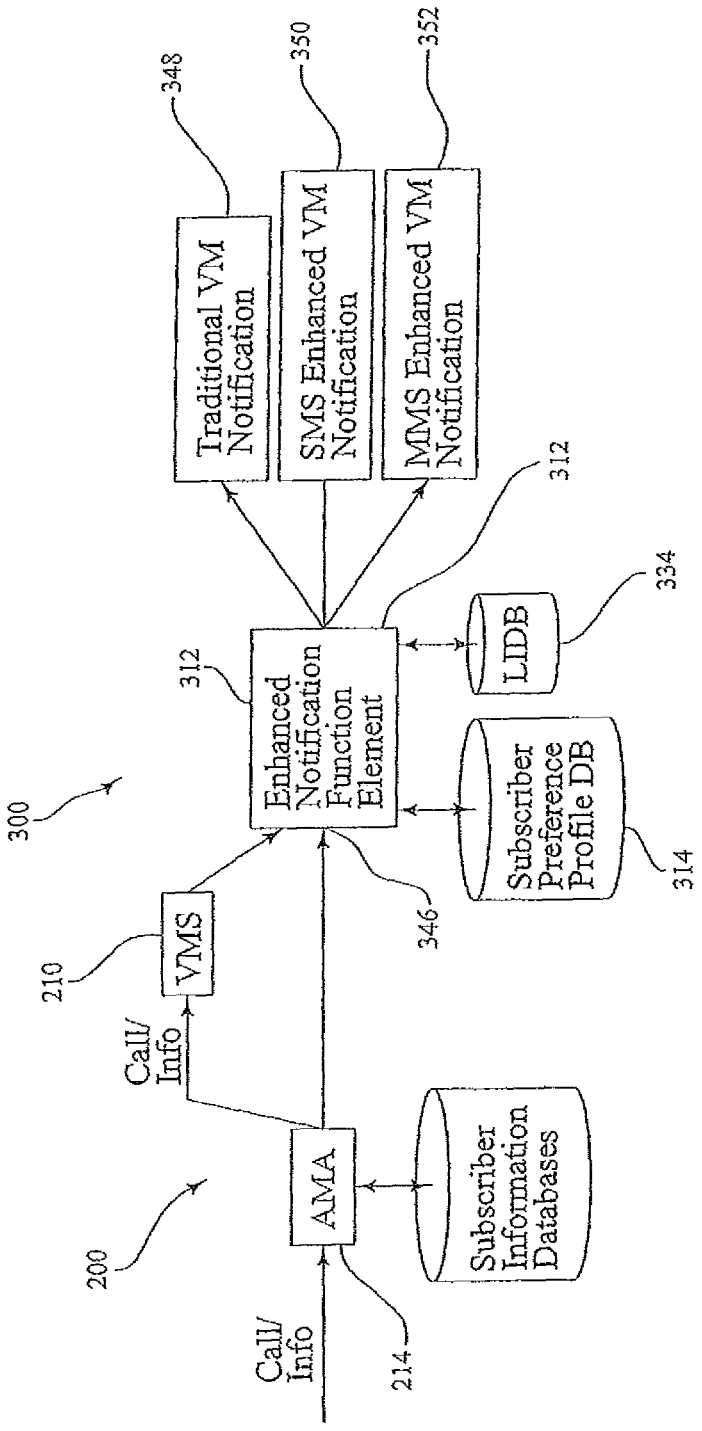

Traditional VM Notification
SMS Enhanced VM Notification
MMS Enhanced VM Notification
348
350
352
312
Enhanced Notification Function Element
LIDB
334
Subscriber Preference Profile DB
314
346
VMS
210
Call/ Info
AMA
Subscriber Information Databases
214
Call/ Info
200
300

FIG. 12

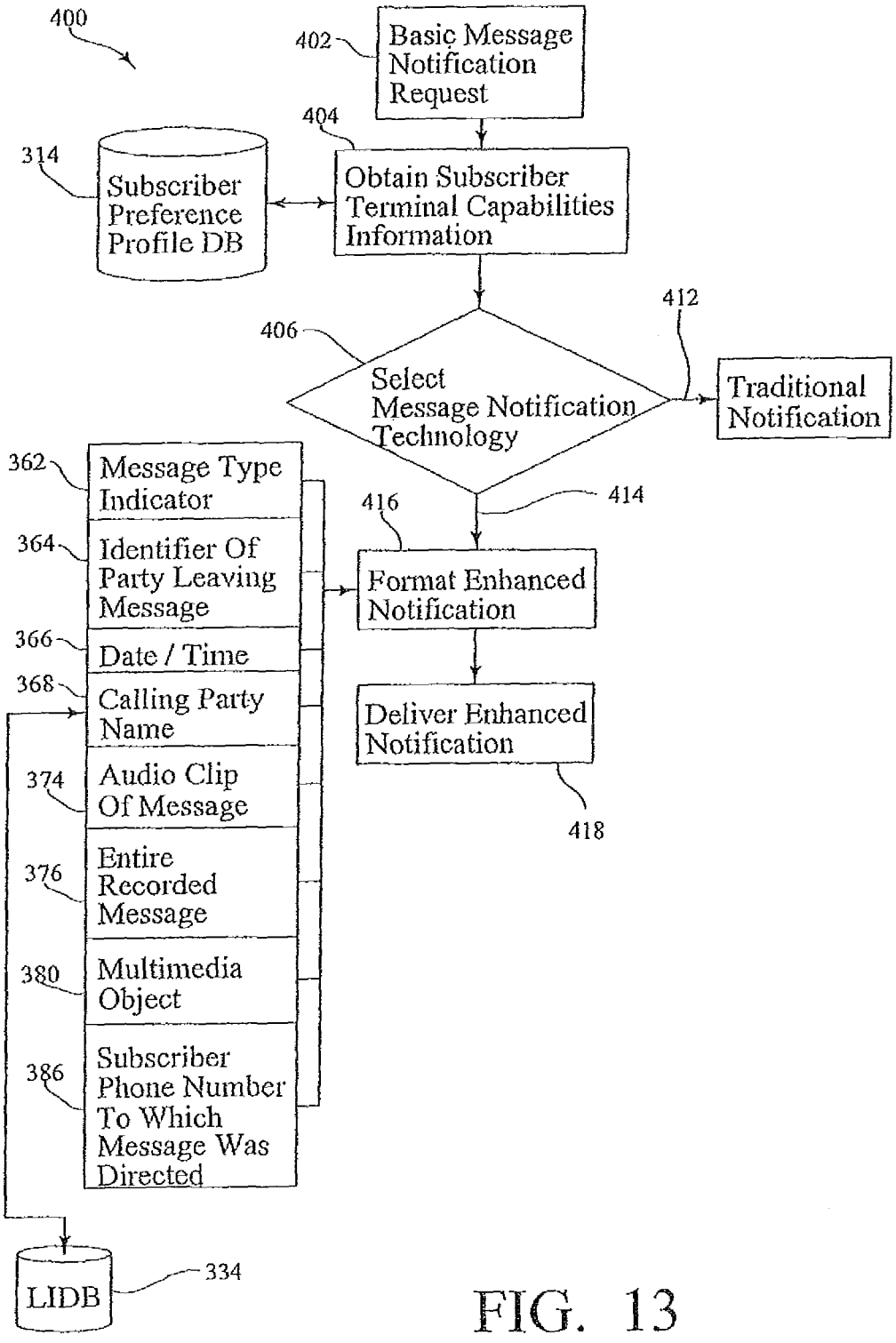

400
402
Basic Message Notification Request
404
314
Subscriber Preference Profile DB
Obtain Subscriber Terminal Capabilities Information
412
406
Select Message Notification Technology
Traditional Notification
362
Message Type Indicator
414
416
364
Identifier Of Party Leaving Message
Format Enhanced Notification
366
Date / Time
368
Calling Party Name
Deliver Enhanced Notification
374
Audio Clip Of Message
418
376
Entire Recorded Message
380
Multimedia Object
386
Subscriber Phone Number To Which Message Was Directed
LIDB
334

FIG. 13

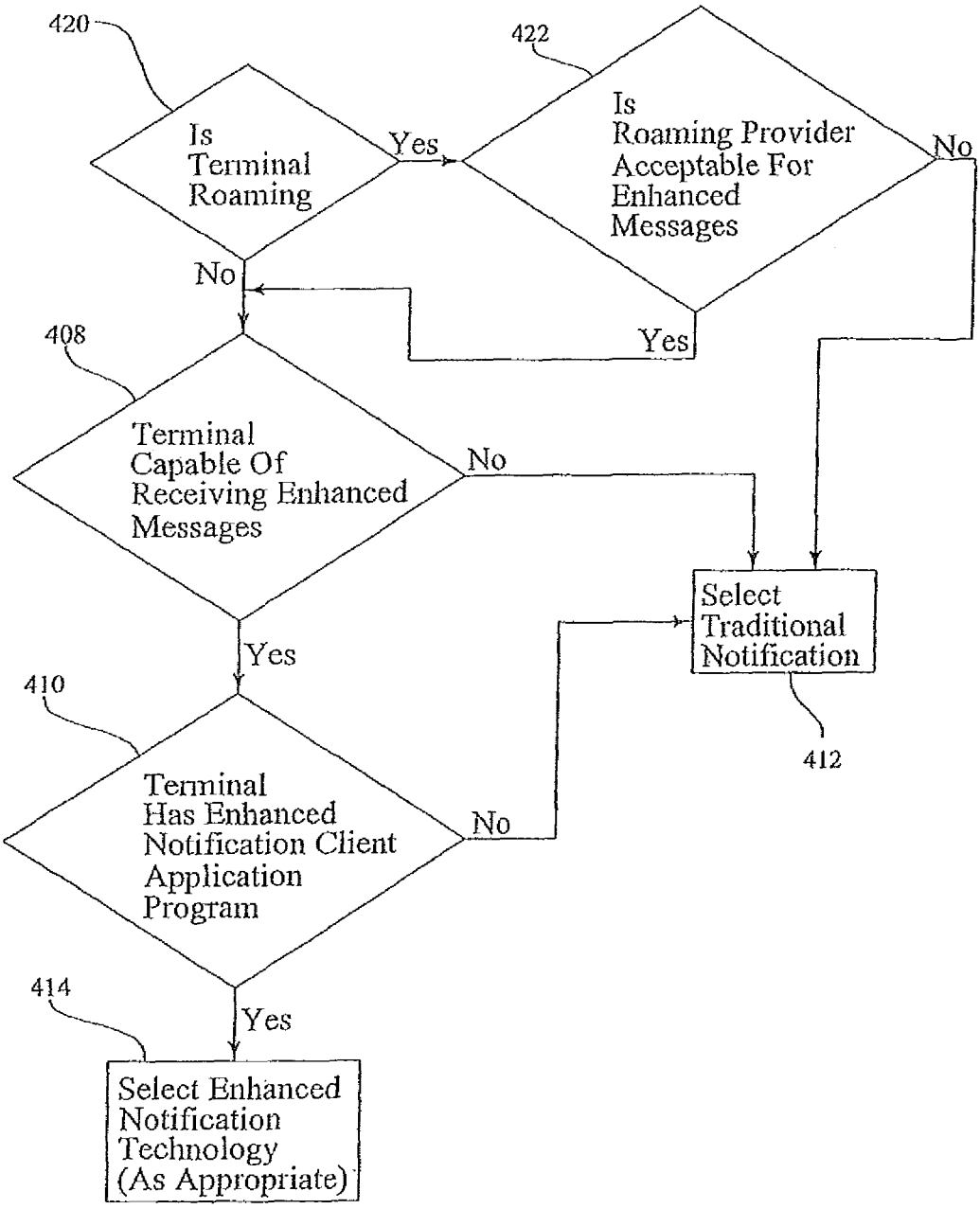

420
Is Terminal Roaming
Yes
422
Is Roaming Provider Acceptable For Enhanced Messages
No
No
Yes
408
Terminal Capable Of Receiving Enhanced Messages
No
Yes
410
Terminal Has Enhanced Notification Client Application Program
No
Yes
414
Select Enhanced Notification Technology (As Appropriate)
Select Traditional Notification
412

FIG. 14

SYSTEM AND METHOD FOR ENHANCED MESSAGE NOTIFICATION

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 13/101,381, filed May 5, 2011(now U.S. Pat. No. 8,548,129), which is a continuation of U.S. application Ser. No. 11/762,277, filed Jun. 13, 2007 (now U.S. Pat. No. 7,953,395), which is a continuation of U.S. application Ser. No. 10/938,350, filed Sep. 10, 2004 (now U.S. Pat. No. 7,248,857), which is a continuation-in-part of U.S. application Ser. No. 10/789,616, filed Feb. 27, 2004 (now U.S. Pat. No. 7,277,529), the entireties of which are herein incorporated by reference. U.S. application Ser. No. 10/789,616, filed Feb. 27, 2004 (now U.S. Pat. No. 7,277,529) is a non-provisional of U.S. Provisional application No. 60/450,738.

BACKGROUND OF THE INVENTION

A. Field of Invention

This invention relates to a system and method for enhanced message notification. More particularly, the invention relates to a system and method for providing message notification in an environment having multiple message notification technologies.

B. Description of Related Art

Voice mail is an extremely useful business and personal tool that allows callers to leave a voice message when the called party is not available to take an incoming call directly. As such, voice mail has been implemented by many telephone carriers, both wireline and wireless, as an additional benefit for their subscribers.

In a typical application, a call to a subscriber is routed to the subscriber's home switch. If the subscriber's communication terminal is not available or if the subscriber does not respond to a call page over the communication network, the switch forwards the call and information regarding the subscriber, including the subscriber's phone number, to a Voice Mail System (VMS). The VMS then records a message from the caller and stores the message in a "mailbox" associated with the subscriber's identifier (e.g. phone number) for later retrieval by the subscriber.

Currently, when there is a new voice message in the mailbox, the VMS will generate a limited notification and alert the subscriber communication terminal to the presence of the new voice message. Upon receiving the notification, the subscriber can call in to the VMS to access their voice message, and listen to the message. This serving mechanism requires the subscriber to call into the VMS, authenticate themselves with their mailbox number and password, and interact with the VMS through multiple steps before being able to listen to their message and determine the identity of the caller and the importance of the message. Navigating through multiple new and saved messages can be tedious, as the messages must generally be reviewed in the order that they were received, potentially causing the subscriber to listen to multiple messages before reaching the desired message.

Additionally, other types of messages, such as e-mail, fax and other multimedia messages, have similar issues with identifying the party that left the message, determining the importance of the message, and navigating through the messages.

Thus, there is a need for a system and method for providing message notification, where the notification is enhanced with an identifier of the party that left the message or the importance of the message. Additionally, there is a need for an improved interface to such messages that utilizes such enhanced notifications to simplify navigation through multiple messages.

Recently, the introduction of Java Wireless Messaging API supporting Short Message Service (SMS) and Multimedia Messaging Service (MMS), and efficient transport networks such as General Packet Radio Service (GPRS) and Enhanced Data rate for Global Evolution (EDGE) have provided enhanced notification and messaging capabilities. However, these developments have also created an environment where multiple notification and messaging technologies are in use. Subscriber terminals have diverse capabilities with respect to such technologies. For instance, some terminals may not be capable of receiving MMS or SMS format messages. Further, some terminals capable of receiving MMS format messages may support only selected multimedia formats (e.g. WAV but not MPEG4). Thus, it has been difficult for communication carriers to provide a single-carrier branded message notification client across all communication terminal vendors.

Therefore, there is a further need for a system and method for providing enhanced message notification in an environment having multiple messaging and notification technologies, and in an environment having subscriber communication terminals with diverse messaging and notification technology and file format capabilities.

SUMMARY OF THE INVENTION

The system and method of the present invention solves these needs, and others, by providing enhanced message notification in an environment having multiple message notification technologies.

Among the advantages, the invention provides richer message notification to the subscriber with an improved message system user interface. Additionally, the invention offers improved visibility and navigation of messages, and allows a single, service provider branded message notification client across all communication terminal brands and messaging capabilities.

Generally described, an enhanced notification function element receives a basic notification request containing an identifier of the subscriber to whom the basic notification request is directed. The enhanced notification function element then queries a subscriber preference profile database to obtain subscriber communication terminal capabilities information. The enhanced notification function element can then select a message notification technology for delivery of an enhanced notification to the subscriber terminal using the subscriber terminal capabilities information.

For example, if the subscriber terminal capabilities information indicates that the subscriber terminal is not capable of receiving enhanced messages, or does not have an enhanced message notification client application program, the enhanced notification function element will select a traditional message notification technology. However, if the capabilities information indicates that the subscriber terminal is capable of receiving enhanced messages and has an enhanced message notification client application program, then the enhanced notification function element may select an enhanced notification technology.

In accordance with other aspects of the invention, the enhanced notification function element formats or assembles an enhanced notification with: a message type indicator; an identifier of the party leaving the message; the date and time that the message was deposited; or a multimedia object. Multimedia objects could include: an audio clip of the name of the

party leaving the message; a photograph; a mood icon; or a presence and availability indicator associated with the party leaving the message. If the enhanced notification function element has access to a Line Information Database (LIDB) and if the identifier of the party leaving the message is a telephone number, the enhanced notification function element may also include the name of the party leaving the message with the enhanced notification.

Still further, according to another aspect of the invention, the subscriber terminal capabilities information includes content format requirements for the subscriber terminal. Thus, the enhanced notification function element can adapt the content of the enhanced notification to comply with the content format requirements of the subscriber terminal.

In accordance with further aspects of the invention, the delivery of the enhanced notification to the subscriber communication terminal is accomplished over a communication network using a delivery system architecture that is appropriate for the selected message notification technology. Exemplary delivery system architectures include: traditional message notification; SMS based message notification; and MMS based message notification.

If the communication terminal is a wireless terminal, the enhanced notification function element might access a terminal roaming status database to determine if the terminal is roaming and, if so, whether the roaming service provider is an acceptable partner for the delivery of enhanced message notifications. If the roaming service provider is not an acceptable partner, for cost or other reasons, the enhanced notification function element can select a traditional message notification technology or refrain from sending a notification.

Advantageously, the system can be integrated with an advanced system for providing voice mail service in an environment having multiple voice mail technology platforms, such as traditional network based voice mail systems and newer multimedia systems capable of delivering voice mail messages directly to the communication terminal. Such a system could utilize an automatic message attendant device which obtains voice mail technology platform indicator information from subscriber information databases to select a voice mail technology platform. The automatic message attendant device may also provide recorded messages directly to the enhanced notification function element. Therefore, according to the further aspect of the invention, the enhanced notification function element enhances the notification with at least a portion of a recorded voice mail message.

Still further, the enhanced notification function element could receive basic notification requests from multiple message systems where a subscriber might receive messages. In this case, the enhanced notification function element might also enhance the notification with information regarding the subscriber phone number to which the message was directed.

Thus, the invention provides a system and method for providing enhanced message notification in an environment having multiple message notification technologies.

The invention is not limited to the preceding description and will be better understood by reference to the following detailed description and the appended drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a functional block diagram of an exemplary system for voice mail service in an environment having multiple voice mail technology platforms.

FIG. **2** is a logic flow diagram of an exemplary method for voice mail service in an environment having multiple voice mail technology platforms.

FIG. **3** is a diagram of an exemplary delivery system architecture for the system of FIG. **1**.

FIG. **4** is a diagram of another exemplary delivery system architecture for the system of FIG. **1**.

FIG. **5** is a diagram of another exemplary system for voice mail service in an environment having multiple voice mail technology platforms.

FIG. **6** is a logic flow diagram of another exemplary method for voice mail service in an environment having multiple voice mail technology platforms.

FIG. **7** is a front view of an exemplary communication terminal displaying a graphical representation of a message mailbox such as might be provided according to the invention.

FIG. **8** is another view of the communication terminal of FIG. **7**, showing a graphical user interface for management of messages.

FIG. **9** is a functional block diagram of an exemplary system for providing enhanced message notification in an environment having multiple message notification technologies.

FIG. **10** is a diagram of an enhanced message notification.

FIG. **11** is a functional block diagram of an exemplary system for providing enhanced message notification, showing several exemplary message notification delivery system architectures.

FIG. **12** is a functional block diagram of an exemplary system for providing enhanced message notification in an environment having multiple messaging technologies, including integration of the system with an Automatic Message Attendant (AMA) device.

FIG. **13** is a flow diagram for a method of enhanced message notification.

FIG. **14** is a flow diagram showing the step of selecting a message notification technology of FIG. **13** in greater detail.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

A. Voice Mail Service in an Environment Having Multiple Voice Mail Technology Platforms

As shown in FIG. **1**, an exemplary system **100** for providing voice mail service in an environment having multiple voice mail technology platforms **110** includes an Automatic Message Attendant (AMA) device **112** and a subscriber profile database **114**. The AMA device **112** has a platform selector element **116**. The platform selector element **116** is in communication with the subscriber profile database **114** via an appropriate data link **118**, such as a Lightweight Directory Access Protocol (LDAP) link or an internal bus connection in the event that the database **114** is integrated with the platform selector element **116**. The subscriber profile database **114** is provisioned with voice mail technology platform indicator information for subscribers.

In operation, a caller **120** places a call **122** to a subscriber **124**. The call **122**, or information about the call, reaches a communication switch **126** through a telecommunication network **128** for connection of the caller **120** to the subscriber **124**. However, upon a triggering event which indicates that the caller **120** should be connected to a voice mail system, the communication switch **126** will deliver information about the call to the AMA device **112**, or, more particularly, to the platform selector element **116**. The call information delivery is accomplished through an appropriate signaling means **130**, such as in-band signaling over the call circuit or out-of-band signaling, such as over a common signaling network (i.e., in

SS7 network or the equivalent). The call information includes an identity (e.g. phone number) of the subscriber to whom the call was placed. The platform selector element **116** then obtains profile information to the subscriber **124** from the subscriber profile database **114**. The profile information includes the voice mail technology platform indicator information for the subscriber **124**. The platform selector element **116** then selects a voice mail system platform **110** by using the voice mail technology platform indicator information. The call **122** and the subscriber identity can then be delivered by an appropriate delivery system architecture **132** to the appropriate voice mail technology platform for providing voice mail service for the subscriber **124**.

Thus, FIG. **2** shows the logical flow of a method used in the exemplary system **100** of FIG. **1**. In the first step **140**, the AMA device **112** receives call information from a communication switch **126**, wherein the call information includes an identifier (e.g. the telephone number) of the subscriber to whom the call was placed. In the next step **142**, the AMA device **112** queries the subscriber profile database **114** for profile information for the subscriber **124**, where the profile information includes voice mail technology platform indicator information for the subscriber. In the next step **144**, the AMA device **112** selects a voice mail technology platform using the voice mail technology platform indicator information obtained in the previous step **142**. In the last step **146**, the AMA device **112** directs the delivery of the call **122**, and the identity of the subscriber to whom the call was placed, to the selected voice mail technology platform for call termination.

There are multiple delivery system architectures **132** that can be utilized by the system **100**, such as a Service Control Point (SCP)-type/IN architecture or a service node architecture. In and SCP-type/IN architecture, the AMA device **112** could return a routing address for the selected voice mail technology platform to the communication switch **126**, so that the call **122** could be routed directly to the selected voice mail technology platform. In the service node architecture, the AMA device **112** could serve as a pass-through switch, passing the call **122** through the AMA device **112** to the selected voice mail technology platform or to another call termination element for use with a MMSC platform, as described below.

FIG. **3** illustrates an exemplary delivery system architecture using an SCP-type/IN delivery architecture wherein the necessary signaling is accomplished through a common signaling network **134**, such as an SS& network. In this example, the AMA device **112** provides the routing address for the selected voice mail technology platform to the communication switch **126** through the common signaling network **134**. The call **122** can then be routed to the selected voice mail technology platform through the telecommunication network **128**, which could be a PSTN or a PLMN.

FIG. **4** illustrates another exemplary delivery system architecture using a service node type delivery architecture wherein the AMA device **112** acts as a pass-through switch, delivering the call **122** to the selected voice mail technology platform with appropriate connections **136** through the AMA device **112**. Such connections **136** could be trunk-type connections, such as MF connections, or individual lines. In this example, the necessary signaling may be accomplished as either in-band signaling or out-of-band signaling (not shown).

FIG. **5** shows another exemplary system **200** for providing voice mail service in an environment having multiple voice mail technology platforms **210**, **212**. The system **200** of FIG. **5** incorporates the elements and features of the system **100** of FIG. **1** and adds expanded functionality. In particular, the system **200** is shown with one voice mail technology platform being a NVMS or MMS VMS platform **210**, and with another platform being a MMSC architecture platform **212**, such as might be present in many telecommunication carrier systems. The system **200** includes an AMA device **214**. The AMA device **214** has a platform selector element **216**, a greeting player and message recorder element **218**, and a content adapter element **220**. Additionally, the system **200** includes: a subscriber profile database **222** in communication with the platform selector element **216**; an announcement database **224** in communication with the greeting player and message recorder element **218**, and a message format requirement database **226** in communication with the content adapter element **220**. All of the database connections are achieved through appropriate data links, such as LDAP protocol links or internal bus connections in the event of integration with their respective elements. The subscriber profile database **222** is provisioned with voice mail technology platform indicator information for subscribers. The announcement database **224** is provisioned with personal or system greeting information for subscribers. The message format requirement database **226** is provisioned with message format requirement information for subscribers, for the purpose of content adaption.

In operation, a caller **228** places a call **230** to a subscriber **232**. The call **230**, or information about the call, reaches a communication switch **234** through a telecommunication network **236** for connection of the caller **228** to the subscriber **232**. Upon a triggering event which indicates that the caller **228** should be connected to a voice mail system, the communication switch **234** will deliver information about the call to the AMA device **214**, or, more particularly, to the platform selector element **216**. The call information delivery is through an appropriate signaling means **238**, such as in-band signaling over the call circuit or out-of-band signaling, such as over a common signaling network (i.e., a SS7 network or the equivalent). The call information includes an identity (e.g., phone number) of the subscriber to whom the call was placed. The platform selector element **216** then obtains profile information for the subscriber **232** from the subscriber profile database **222** using the subscriber identity. The profile information includes voice mail technology platform indicator information for the subscriber **232**. The platform selector element **216** then selects a voice mail technology platform by using the voice mail technology platform indicator information.

If the selected voice mail technology platform is the NVMS or MMS VMS platform **210**, the call **230** and the subscriber identity can then be delivered by an appropriate delivery system architecture **240**, such as described earlier, for call termination at the selected platform **210**.

However, if the selected voice mail technology platform is the MMSC architecture platform **212**, the subscriber identity will be delivered and the caller **228** will be connected with the greeting player and message recorder element **218**. The greeting player and message recorder element **218** then obtains personal or system greeting information for the subscriber **232** from the announcement database **224** using the subscriber identity. The greeting player and message recorder element **218** then plays the subscriber's personal or system greeting to the caller **228**, and records a message from the caller **228**. Thus, the greeting player and message recorder element **218** provides termination of the call, much like the NVMS or MMS VMS platform **210** does. Once recorded, the greeting player and message recorder element **218** can forward the message and the subscriber identity to the content

adapter element **220** over an appropriate data link **242**, or, directly to the MMSC architecture voice mail platform **212** (not shown).

The message may be directed to the content adapter element **220** since various MMS-capable terminals may have differing voice clip message format requirements. The content adapter element **220** may then obtain message format requirement information for the subscriber **232** (or, more accurately, the subscriber's MMS-capable terminal) from the message format requirement database **226** using the subscriber identity. The content adapter element **220** then converts the recorded voice mail message to the format indicated by the message format requirement information. Once converted, the content adapter element **220** can forward the formatted message and the subscriber identity to the MMSC **212** for the delivery to the subscriber **232** (or to the subscriber's MMS-capable terminal) over an appropriate data link **244**, such as an IP protocol or an X.25 protocol link.

Another possible configuration shown in FIG. **5** is moving the call termination function from the NVMS or MMS VMS platform **210** to the greeting player and message recorder element **218**, and delivering the recorded message and the subscriber identity to the NVMS or MMS VMS platform **210** over an appropriate data link **246**.

Additionally, it should be noted that the content adapter element **220** could be combined with the greeting player and message recorder element **218**, such that the combined greeting player, message recorder and content adapter element (not shown) would deliver a properly formatted message to the selected voice mail technology platform over an appropriate data link.

Further still, the content adapter function could be moved to the selected voice mail technology platform, such that the voice mail platform would receive the recorded message from the greeting player and message recorder element **218** and perform any necessary content conversion at the voice mail platform.

FIG. **6** shows the logical flow of a method used in the exemplary system **200** of FIG. **5**. In the first step **250**, the AMA device **214** receives call information from a communication switch **234**, where the call information includes the identity (e.g. the telephone number) of the subscriber to whom the call was placed. In the next step **252**, the AMA device **214** queries the subscriber profile database **222** for the profile information for the subscriber **232**, where the profile information includes voice mail technology platform indicator information for the subscriber. In the next step **254**, the AMA device **214** selects a voice mail technology platform using the voice mail technology platform indicator obtained in the previous step **252**.

If the NVMS or MMS VMS platform **210** is selected, the call and the call information can then be directed to the NVMS or MMS VMS platform **210**.

If the MMSC architecture platform **212** is selected, in the following step **256**, the greeting player and message recorder element **218** of the AMA device **214** queries the announcement database **224** for personal greeting information for the subscriber **232**. In the next step **258**, the greeting player and message recorder element **218** plays the personal greeting to the caller **228**, and records a message for the subscriber **232**. In the succeeding step **260**, the content adapter element **220** of the AMA device **214** queries the message format requirement database **226** for message format requirement information for the subscriber **232**. In the succeeding step **262**, the content adapter element **220** converts the recorded voice mail message to the format indicated by the message format requirement information. In the last step **264**, the AMA device **214** delivers the message to the subscriber **232** (or to the subscriber's MMS-capable terminal) through the MMSC architecture platform **212**.

B. Enhanced Notification in an Environment Having Multiple Message Notification Technologies

An environment having multiple messaging technologies also creates both opportunities and obstacles for sending message notifications. Traditionally, message notification, such as voice mail message notification, included only sending an instruction to the communication terminal to turn on an indicator on the terminal, such as a light or an icon on a display screen. However, the advanced messaging technologies, such as Short Message Service (SMS) and Multimedia Messaging Service (MMS), and advanced messaging Application Program Interfaces (APIs) supporting SMS and MMS, such as Java Messaging API, the notification message itself can be enhanced with additional information, such as the name and phone number of the party that left the message, the time that the message was deposited, and other information. This information can then be displayed on the communication terminal to provide richer message notification to the user and an improved interface.

For instance, FIG. **7** shows an exemplary communication terminal **301** having a display device **302**, such as a LCD display, and an input device **303**, such as a keypad. The display device **302** can be used to provide a graphical representation of a message mailbox, such as a voice mail notification inbox, where the notifications contain enhanced information such as the name **304** or number **305** that identifies the party that left each message. Additionally, an API allows adaptive presentation of the notifications, presenting notifications according to the subscriber's preferences and usage pattern rather than simply in the order that the messages were deposited.

Further, as shown in FIG. **8**, the API can provide a graphical user interface (GUI) for management of the messages. Thus, by selecting a notification message as shown in the notification inbox of FIG. **7**, additional information, such as the time **306** the message was deposited. Additionally, the API may allow the subscriber to initiate standard message management functions, including review, listen to, erase, store, forward, or attach note and forward. Further, communication terminals with multimedia capabilities could have options to play the calling party's name, play a short clip of a voice mail message, or download an actual voice mail message, as shown.

As shown in FIG. **9**, an exemplary system **300** for providing enhanced message notification in an environment having multiple message notification technologies **310** includes an enhanced notification function element **312** and a subscriber preference profile database **314**.

Additionally, the exemplary system **300** could also include a subscriber communication terminal **324** and a communication network **326**.

The subscriber preference profile database **314** is provisioned with data relating subscriber identifier information, such as subscriber telephone numbers or other identification information, with subscriber communication terminal capabilities information. Subscriber communication terminal capabilities information includes information such as whether the terminal **324** is capable of receiving enhanced messages, such as SMS or MMS messages, whether the terminal **324** has an enhanced notification client application program **328**, and any content format requirements that the terminal **324** may have.

The enhanced notification function element **312** is in communication with the subscriber preference profile database **314** through a subscriber preference profile database interface **318**, such as a LDAP link or an internal bus connection in the event that the database **314** is integrated with the enhanced notification function element **312**. Additionally, the enhanced notification function element **312** also has a basic notification request input **320** and enhanced notification outputs **322**.

The subscriber communication terminal **324**, such as a mobile phone, wireless PDA, etc., is in communication with the enhanced notification outputs **322** through the communication network **326** and the selected message notification technology **310**. The communication terminal **324** has an enhanced message notification client application program **328** for receiving an enhanced notification and a display **330** for displaying the details of the notification.

In operation, the enhanced notification function element **312** receives a basic notification request **332** at the basic notification request input **320**. The basic notification request **332** is a request to notify the subscriber that a new message, such as a voice mail message, has arrived at, for instance, a voice mail system (VMS) **210**, as described above. The basic notification request **332** contains an identifier of the subscriber, or a subscriber identity, to whom the basic notification is directed. The identifier would most likely be an address or phone number of the subscriber's communication terminal, but could be any other data which would uniquely identify the subscriber to be notified. Additionally, the basic notification request **332** arrives via appropriate signaling means, such as SS7 or IF.

The enhanced notification function element **312** then queries the subscriber preference profile database **314** to obtain subscriber communication terminal capabilities information using the subscriber identifier. The enhanced notification function element **312** can then determine, among other things, if the subscriber terminal **324** has: 1) enhanced messaging capabilities; and 2) an enhanced message notification client application program **328**.

The enhanced notification function element **312** then selects a notification technology **310** for delivery of an enhanced notification message **333** to the subscriber terminal **324**. The enhanced notification function element **312** uses the subscriber communication terminal capabilities information as the criteria for making the selection. Primary considerations in selecting a message notification technology are whether the subscriber communication terminal has the capability to receive enhanced messages, such as SMS or MMS messages, and also has an enhanced notification client application program. Thus, if the subscriber terminal does not have capabilities for receiving enhanced messages, or does not have an enhanced notification client application program, the message notification will need to be delivered as a traditional message notification message. However, if the subscriber terminal does have capabilities for receiving enhanced messages, and also has an enhanced notification client application program, an enhanced notification technology may be selected.

The enhanced notification function element **312** can then format, or assemble, an enhanced notification **333** with enhanced information. Examples of enhanced information include an identifier of the party leaving the message, and the date/time that the message was left. This information can be used by the subscriber to determine the importance of the message. Alternatively, the enhanced notification client application program may be programmed to adaptively present message notifications based on subscriber preferences or usage patterns. Further, the enhanced notification function element **312** can determine from the terminal capabilities information if any content adaptation is required in order for the terminal **324** to properly receive the enhanced notification **333**, and perform the necessary content adaptation to the enhanced notification **333**.

Thus, FIG. **10** shows an exemplary enhanced voice mail notification message **333** containing, in addition to the subscriber identifier **360**, a message type indication **362**, the identifier of the party leaving the message **364**, and the date/time that the message was left **366**.

The message type indicator **362** is used to indicate to the subscriber terminal **324** that the notification **333** is enhanced, and should be forwarded to the enhanced notification client application program **328** for processing. Further, the message type indicator **362** will indicate the actual message type, such as voice mail, e-mail, fax or multimedia, in an environment having multiple message types. Thus, the client application program **328** can provide a distinctive audio alert or icon for each message type, in addition to providing the graphical representation of a message mailbox, as described earlier.

Returning to FIG. **9**, the system **300** may also include a Line Information Data Base (LIDB) **334** provisioned with data relating calling party phone numbers with calling party names. The enhanced notification function element **312** is in communication with the LIDB **334** through a LIDB interface **336**, which could be a SS7 or IP communication link. Thus, in an environment where messages are deposited by telephone, such as with voice mail and fax, the identifier of the party leaving the message will be the calling party phone number. The enhanced notification function element **312** can then obtain the calling party name from the LIDB **334** using the calling party phone number. The enhanced notification message **333** can then be enhanced further with the calling party name **368**, as shown in FIG. **10**.

The delivery of the enhanced notification **333** may be accomplished through a delivery system architecture appropriate for the selected message notification technology **310**. As shown in FIG. **11**, exemplary delivery system architectures include: traditional message notification, SMS based message notification, or MMS based message notification. Thus, shown are a Short Message Service Center (SMSC) **354** as a part of the delivery system architecture for SMS enhanced message notification technology, and a Multimedia Messaging Service Center (MMSC) **356** as a part of the delivery system architecture for MMS enhanced message notification technology.

C. Enhanced Message Notification—Wireless Roaming Issues

The subscriber communication terminal **324** could be a wireless terminal, in which case the communication network **326** could be a Public Land Mobile Network (PLMN). When the terminal **324** is a wireless terminal, roaming charges may apply to delivery of enhanced notifications. If roaming charges apply, the subscriber's home service provider may have rules for determining how the enhanced notification and the content of such a notification should be sent, in order to reduce adverse charges to the subscriber.

The system **300** may have a terminal roaming status database **370** that relates subscriber identifier information with terminal roaming status information, such as an identification of the communication switch that is currently serving the terminal **324**. The enhanced notification function element **312** may then be in communication with the terminal roaming status database **370** through a terminal roaming status database interface **372**. Typically, the roaming status information

is contained in a Home Location Register (HLR) which the enhanced notification function element **312** can access through a SS7 Signaling Network. By accessing the roaming status database **370**, the enhanced notification function element **312** can determine if the terminal **324** is roaming. If the enhanced notification function element **312** determines that the terminal **324** is roaming, the enhanced notification function element **312** may apply the home service provider's rules to determine if and how the enhanced notification should be sent.

D. Enhanced Message Notification—Integration with Automatic Message Attendant (AMA) Device

Advantageously, as shown in FIG. **12**, the system **300** described can be integrated with the system **200** for providing voice mail service in an environment having multiple voice mail technology platforms described above. Thus, an Automatic Message Attendant (AMA) device **214** may serve to receive a call and select a voice mail technology platform. If a voicemail system (VMS) platform **210** is selected, the call and call information can be directed to the VMS platform **210**, which will record a message and generate a basic message notification request **332**. The basic notification request **332** will then be received by the enhanced notification function element **312** at the basic notification request input **320**. The enhanced notification function element **312** can then format an enhanced notification **333** and perform any necessary content adaptation, as described above. The notification **333** can then be delivered, for example, using a traditional message notification technology **348**, a SMS enhanced message notification technology **350**, or a MMS enhanced message notification technology **352**, as appropriate.

However, the enhanced notification function element **312** may also have an AMA message input **346** for receiving a recorded voice mail message directly from the AMA device **214**, as described above. Thus, returning to FIG. **10**, the enhanced notification function element **312** may even further enhance the notification **333** with a short audio clip (or voice clip) of the voice mail message **374**, or a file containing the entire recorded voice mail message **376**, if the terminal **324** is capable of receiving such messages.

E. Enhanced Message Notification—Association of Objects with Party Leaving Message

Additionally, the enhanced notification function element **312** may still further enhance the voice mail notification message **333** with an audio clip of the caller's name **378**, and a photo, mood icon **388** (or moodicon), presence and availability indicator, or any other multimedia object **380** that the subscriber might choose to associate with the identifier of the party leaving the message **364** in the subscriber preference profile database **314**.

For presence and availability information, a presence and availability engine **392**, such as shown in FIG. **9**, and related procedures would be used to obtain the presence and availability status of the calling party (such as defined in 3GPP IS 22.141 and 3GPP US 23.141). As the presence and availability of the calling party changes, the enhanced notification function element **312** can update the notification message to reflect current status information on the subscriber's terminal display.

Returning now to FIG. **9**, a web interface **382** may be provided so that the subscriber can associate objects with the identifier of the party leaving the message.

F. Enhanced Message Notification—Other Voice Mail Systems

Additionally, as shown in FIG. **9**, the enhanced notification function element **312** could receive basic notification requests from other message systems **384** where a subscriber might receive messages, such as work, home and mobile phones. In this case, the enhanced notification function element **312** might also enhance the notification **333** with information regarding the subscriber phone number to which the message was directed.

A representation of the enhanced notification **333** having information regarding the subscriber phone number to which the message was directed **386** is shown in FIG. **10**.

G. Method of Enhanced Message Notification

Thus, as shown in FIG. **13**, an exemplary method **400** for enhanced message notification includes the steps of: **402** receiving a basic message notification request; **404** obtaining subscriber terminal capabilities information (from a subscriber preference profile database **314**); and **406** selecting a message notification technology for delivery of an enhanced notification.

As further shown in FIG. **14**, the step of **406** selecting a message notification technology may include the steps of: **408** determining if the subscriber terminal is capable of receiving enhanced messages; and **410** determining if the terminal has an enhanced notification client application program. If the terminal is not capable of receiving enhanced messages or does not have an enhanced notification client application program, then the next step **412** is to select a traditional notification technology. However, if the terminal is capable of receiving enhanced message and has an enhanced notification client application program, then the next step **414** is to select an enhanced notification technology. If more than one enhanced notification technologies are available, such as SMS or MMS, this step **414** may include selecting the most appropriate enhanced notification technology.

Returning to FIG. **13**, if an enhanced notification technology is selected **414**, the exemplary method **400** for enhanced message notification may also include the steps of: **416** formatting an enhanced notification; and **418** delivering the enhanced notification to the terminal using the selected message notification technology. The enhanced notification may include information such as: a message type indication **362**, an identifier of the party leaving the message **364**; the date and time that the message was deposited **366**; the calling party name **368** (obtained from a LIDB **334**, as described above); an audio clip of a portion of a recorded voice message **374** or an entire recorded message **376**; a multimedia object **380**, such as an audio clip or the name of the party leaving the message, or a photograph or mood icon **388** associated with the party leaving the message; or a subscriber phone number to which the message was directed **386**, in the event that notification requests may be coming from multiple messaging systems.

Lastly, as shown in FIG. **14**, if the terminal is a wireless terminal, a preliminary step in selecting a message notification technology may be to **420** determine if the terminal is roaming. If the terminal is not roaming, the selection of a message notification technology may proceed as described earlier. However, if the terminal is roaming, the next step could be to **422** determine if the roaming service provider is an acceptable partner, for cost or other reasons, for delivering enhanced messages. If the roaming service provider is an acceptable partner, the selection of a message notification technology may proceed as described earlier. However, if the

roaming service provider is not an acceptable partner, traditional notification would be selected **412**.

H. Conclusion

In the above description of the present invention, it should be recognized that the system, including the described elements thereof, and the various database elements may be implemented on digital computing equipment, or the equivalent, through the use of computer programs, or the equivalent. Thus, the method of the invention may be found as executable instructions contained on a computer readable medium.

Thus, the invention provides a system and method for providing enhanced message notification in an environment having multiple notification technologies. One of ordinary skill in the art will recognize that additional configurations are possible without departing from the teachings of the invention or the scope of the claims which follow. This detailed description, and particularly the specific details of the exemplary embodiments disclosed, is given primarily for clearness of understanding and no unnecessary limitations are to be understood therefrom, for modifications will become obvious to those skilled in the art upon reading the disclosure and may be made without departing from the spirit or scope of the claimed invention. With regard to the claims, no claim is intended to invoke the sixth paragraph of 35 U.S.C. Section 112 unless it includes the term "means for" followed by a participle.

The invention claimed is:

1. A method, for delivering a message to a mobile terminal, comprising:

determining, by a system using a processor, in a roaming determination, whether the mobile terminal is roaming; and

determining, by the system, based on the roaming determination, in a message determination, whether to provide a traditional message or an enhanced message, comprising:

determining, in response to a negative result from the roaming determination, to provide the enhanced message; and

in response to an affirmative result from the roaming determination:

determining, in an acceptability determination, whether an applicable roaming service provider is an acceptable partner for delivering the enhanced message;

determining, in response to an affirmative result from the acceptability determination, to provide the enhanced message; and

determining, in response to a negative result from the acceptability determination, to provide the traditional message.

2. The method of claim **1**, wherein the acceptability determination is based on a cost that the applicable roaming service provider charges for delivering enhanced messages.

3. The method of claim **1**, wherein the acceptability determination is based on whether the applicable roaming service is capable of delivering enhanced messages.

4. The method of claim **1**, further comprising:

preparing, by the system, if it is determined in the message determination, to provide the traditional message, to provide the traditional message including formatting, in a traditional-message formatting operation, the traditional message; and

preparing, by the system, if it is determined in the message determination to provide the enhanced message, to provide the enhanced message including formatting, in an enhanced-message formatting operation, the enhanced message.

5. The method of claim **4**, wherein the enhanced-message formatting operation comprises formatting the enhanced message to have a message type indicator indicating that the enhanced message is an enhanced notification and should be processed by an enhanced notification program.

6. The method of claim **4**, wherein the enhanced-message formatting operation comprises formatting the enhanced message to have a multimedia object.

7. The method of claim **6**, wherein the enhanced-message formatting operation comprises formatting the enhanced message to include the multimedia object being associated with a party leaving a notification for a user of the mobile terminal.

8. The method of claim **6**, wherein the enhanced-message formatting operation comprises formatting the enhanced message to have the multimedia object including at least one object type selected from a group of object types consisting of:

an audio clip identifying a name of a party leaving a notification for a user of the mobile terminal;

a picture identifying the party;

a presence indicator associated with the party; and

an availability indicator associated with the party.

9. The method of claim **1**, wherein the message determination is made based on the roaming determination and on user preferences associated with the mobile terminal.

10. The method of claim **1**, wherein:

the method further comprises obtaining information indicating whether the mobile terminal is roaming; and

the roaming determination is based on the information received.

11. The method of claim **10**, wherein obtaining the information indicating whether the mobile terminal is roaming includes receiving the information from a roaming-terminal database.

12. A system, comprising:

a processor; and

a computer-readable medium comprising computer-executable instructions that, when executed by the processor, cause the processor to perform operations, for delivering a message to a mobile terminal, comprising:

determining, in a roaming determination, whether the mobile terminal is roaming; and

determining, based on the roaming determination, in a message determination, whether to provide a traditional message or an enhanced message, comprising:

determining, in response to a negative result from the roaming determination, to provide the enhanced message; and

in response to an affirmative result from the roaming determination:

determining, in an acceptability determination, whether an applicable roaming service provider is an acceptable partner for delivering the enhanced message;

determining, in response to an affirmative result from the acceptability determination, to provide the enhanced message; and

determining, in response to a negative result from the acceptability determination, to provide the traditional message.

13. The system of claim **12**, wherein the acceptability determination is based on a cost that the applicable roaming service provider charges for delivering enhanced messages.

14. The system of claim 12, wherein the acceptability determination is based on whether the applicable roaming service is capable of delivering enhanced messages.

15. The system of claim 12, wherein the operations further comprise:

preparing, if it is determined in the message determination, to provide the traditional message, to provide the traditional message including formatting, in a traditional-message formatting operation, the traditional message; and

preparing, if it is determined in the message determination to provide the enhanced message, to provide the enhanced message including formatting, in an enhanced-message formatting operation, the enhanced message.

16. The system of claim 12, wherein the message determination is made based on the roaming determination and on user preferences associated with the mobile terminal.

17. A computer-readable storage device comprising computer-executable instructions that, when executed by a processor, cause the processor to perform operations, for delivering a message to a mobile terminal, comprising:

determining, in a roaming determination, whether the mobile terminal is roaming; and

determining, based on the roaming determination, in a message determination, whether to provide a traditional message or an enhanced message, comprising:

determining, in response to a negative result from the roaming determination, to provide the enhanced message; and

in response to an affirmative result from the roaming determination:

determining, in an acceptability determination, whether an applicable roaming service provider is an acceptable partner for delivering the enhanced message;

determining, in response to an affirmative result from the acceptability determination, to provide the enhanced message; and

determining, in response to a negative result from the acceptability determination, to provide the traditional message.

18. The computer-readable storage device of claim 17, wherein the acceptability determination is based on a cost that the applicable roaming service provider charges for delivering enhanced messages.

19. The computer-readable storage device of claim 17, wherein the acceptability determination is based on whether the applicable roaming service is capable of delivering enhanced messages.

20. The computer-readable storage device of claim 17, wherein the message determination is made based on the roaming determination and on user preferences associated with the mobile terminal.

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